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DISCUSSION.

PROFESSOR THILLY ON "INTERACTION."

In the March number of this Review there is an article by Professor Frank Thilly entitled "The Theory of Interaction," in which he maintains that mind and brain act upon each other; or at least that there is no good reason for denying that they do. The objections urged against the theory of interaction by those who hold that the mind processes and the brain processes are 'parallel' are considered, and are found to be without validity. The principle of the conservation of energy does not involve the impossibility of interaction; for, in the words quoted from Sigwart, the "truth of a principle within a closed circle of constant material causes does not justify us in the inference that material things must, under all circumstances, form a circle closed on all sides." Nor does the notion of causality conflict with interaction; it "does not demand that the effect be identical with the cause"; and, therefore, there is no reason "why a physical effect should always have a physical cause." Moreover, as a matter of experience, we find that since a cause is that phenomenon without which another phenomenon cannot occur, conscious states are actually causes of physical movements.

Professor Thilly may be taken as the representative of a large body of opinion. The theory of interaction is, as he says, the common-sense theory; it is the theory of such eminent psychologists as James and Ladd in this country; and it is gaining a large number of supporters in Germany.

The problem, of which this theory is an attempted solution, is the correlation of two distinct sciences, physiology and psychology. It may thus be regarded as one of the problems which meet us at the threshold of philosophy. It is one of the first duties of philosophy, or it is one of the preliminaries to philosophy, to criticise conceptions. Has Professor Thilly performed this criticism? He has subjected to scrutiny the principle of conservation of energy; he has also criticised the concept of causality. But criticism must be carried further.

The failure to criticise is not to be charged against the believer in interaction rather than against the upholder of parallelism. Both have neglected this duty. I think it can be shown that when criticism is applied, the problem disappears, or entirely changes its character.

In both theories it is assumed that psychology and physiology represent two series of facts, equally independent, equally objective. It is also assumed that the facts which physiology considers are generically distinct from those which are considered by psychology. It is true that Professor Thilly asks how we know that a state of consciousness is unlike a brain state; and he remarks that heat is a sensation and motion is a sensation. But these suggestions do not seem to modify his main argument, which proceeds on the basis of the principle asserted by parallelism that "nature reveals to us two kinds of existence, mental and material, which are diametrically opposed to each other." The peculiar problem of the relation of mind and brain arises because they are taken as representing heterogeneous forms of existence. Is this view justifiable?

The science of physiology presents the brain as material; and the material is regarded by natural science as objective and foreign to thought. But what, after all, is this matter of which science speaks? It consists of the conscious states of a percipient intelligence. So far, the theory of Berkeley, who was in the line of the great philosophical critics, is right. We do not at present consider the validity of Berkeley's denial that the matter present to the senses is a sign of a thing in itself. The matter which he had in mind was the matter which science treated as objective then, as it does now; it was the matter which consisted of sensations experienced or anticipated, especially those of sight and touch. The brain consists of conscious states in a percipient's mind; the color of it does not exist except for this percipient's vision, and its solidity has no reality save for his faculty of touch. Could the physiologist see the atoms of the brain, he would still have reached nothing but his own sensations.

It might possibly be said that these sensations of the percipient are copies of what is objective, that there is an objective color and an objective solidity, and that the atoms perceived are the counterpart of objective atoms. This is not, however, the view of science, for science believes that it is directly intuiting reality. And, apart from this, the supposition is beset by many difficulties. The influence from the object has to reach the percipient through many media; and it is not probable that the sensation resulting from the operation of these media, will be identical in nature with the object from which the stimulus starts. Again, the sensation varies with the varying relations of the percipient; which form of it represents the object? But it does not specially concern us at present to refute this supposition. Were it granted, it would mean that the brain is a conscious reality or a set of sensations; for to be the counterpart of the sensations in the percipient's mind, it must be a series of conscious states.

There is one important conception in the scientific account of the brain which has not been taken into account in the statements already made, to which, however, special attention is necessary. It is said that energy is associated with the matter of the brain as with the matter of the physical world in general, and, possibly, is not merely associated with matter, but constitutes its objective existence. It may, therefore, be said that it is this system of energy which is contrasted with conscious states; it may seem to be objective, and to be irreducible to the percipient's conscious states.

In one sense it is true that the energy of the material world does not consist of the percipient's states. Energy is not something given in his immediate sensations; he cannot by much searching with his senses find energy. It is something that is inferred. In this sense energy is a metaphysical entity.

But does science use energy metaphysically? It is not evident that science is in any way disposed to be metaphysical when it speaks of energy. It uses the conception simply for a symbol to present the order of the changes which occur in the phenomena of sense. This conclusion would not be invalidated were the theory accepted that matter consists solely of energy. The idea of such energy is introduced to explain the changes in phenomena, and though it may seem to be considered as abstracted from phenomena, all descriptions of it are nevertheless in terms of phenomena: energy is the power to do work, and it is measured in such terms as foot-pounds. Moreover, it is more than probable, according to Professor Tait, that "energy will ultimately be found in all its varied forms to depend upon *motion* of matter;"[1] and motion of matter means change in the phenomena of sense. In Professor Thilly's words, "Motion is a sensation." It is, indeed, unlikely that science will be seduced into metaphysical speculations. It is wise to restrict itself to an account of the relations of sense-data. From another point of view, this restriction is a veritable limitation, and, by reason of this limitation, science must renounce the claim to be knowledge of objects. Yet science has learned what great advantages are to be gained by keeping to the task of describing phenomena.

But a metaphysical treatment of matter is legitimate; let us therefore suppose that the metaphysics of science is taken seriously, and energy is regarded as an objective, independent entity. Energy is a concept that is purely animistic; it is, like casuality, force, will, and other ideas, derived from our feelings of effort. But, whatever may be decided as to its origin, it is a *mental concept.* And to say that it is objective, is to say that matter is of the nature of thought. The metaphysics may be of little value, there may be no ground for thinking that the essence of matter is properly represented by such an idea as energy. Professor Thilly quotes Mach's warning against regarding the intellectual machinery, employed in the representation of the world on the stage of thought, as the basis of the real world. Yet, if energy is to be taken metaphysically, there is no escape from the conclusion that matter is, after all, of the same nature as mind. It may be added that if the older idea of substance be introduced, we are still dealing with an animistic idea or mental concept.

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[1] *Properties of Matter*, p. 6.

This criticism of physiology shows us that all the data of that science resolve themselves into conscious states. Most probably physiology is offering simply an account of immediate sensations, felt or anticipated; the *esse* of its matter resolves itself into *percipi.* But should it claim to pass beyond immediate sensations and give an account of matter as objective, it represents matter as conscious.

Let the science of psychology be now considered. It need not be pointed out that the facts with which this science deals are facts of consciousness. It may, however, be necessary to call attention to the fact that the psychologist, in dealing with the conscious states of other persons than himself, is dealing with that to which he cannot have direct access. The psychologist may be called upon to consider his neighbor's brain; at such a time he is occupied with his own sensations. But when he considers his neighbor's conscious experience, he is thinking of what is, as Clifford puts it, a thing in itself. We cannot enter directly into the conscious life of others. To quote Professor James: "No thought ever comes into direct *sight* of a thought in another personal consciousness than its own. Absolute insulation, irreducible pluralism, is the law. . . . The breaches between such thoughts are the most absolute breaches in nature."[1] It need not be maintained that such insulation is absolutely necessary. It has been suggested that "were our physiological knowledge and surgical manipulation sufficiently complete, it is conceivable that it would be possible for me to be conscious of your feelings. . . . let us say, for example, by connecting the cortex of your brain with that of mine through a suitable commissure of nerve substance."[2] What is to be observed is that such commissures do not exist at present, and we are not likely to have them. Until we have them, insulation is the law of our spirits.

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[1] *Psychology*, Vol. I, p. 226.

[2] Karl Pearson, *The Grammar of Science*, p. 60.

If the results of this analysis be considered, we find, first of all, that there are two, or, at most, three series of facts to be taken account of when the scientist is studying the relation of mind to brain. There is the series of the percipient's sensations called the brain of the person observed. Entirely distinct from this is the series of conscious experiences in the person observed, which cannot be directly intuited. Possibly a third series should be added; the forms of substance and energy may be, like the members of the second series, entities that are objective and metaphysical.

But the mystery of the interaction of mind and brain has disappeared. Let the third series be omitted for the moment, because it is doubtful how far science is in earnest with it. The objective series of conscious states and the series in the observer's mind—there is no heterogeneity here to make interaction mysterious. If these series were the only factors in the case, the one might very well be taken for the reflection or effect of the other; on this view, it would not so correctly explain the relation to say that one acted on the other, as to say that one produced the other in a percipient mind.

Suppose, however, that the metaphysical factors indicated by science were taken seriously, substance and energy would be interposed between the other two series. But there is still no heterogeneity. Substance and energy, as we have seen, are mental concepts; their laws are intelligible laws. They are therefore homogeneous with the two series; and that there should be causal relations connecting all the three series need occasion no special perplexity. It would have to be determined by observation what modes of interaction existed. While it is true that in a homogeneous sphere, such as the physical universe is believed to be, everything acts on everything else, it is also true that particular effects demand particular conditions, and it might prove to be the case that human minds were dependent on special forms of energy in such a way that only through these they could produce what are known as human actions.

If we proceed to take into account all that is regarded as coming between the brain of the person observed and the mind of the observer, nerve-fibers, end-organs of sense, and, it may be, an inorganic medium such as the luminiferous æther, we find that their objective constitution is similar to that of the brain. In the case of all of them science presents the data of sense along with the animistic conceptions of substance and energy. There is still no heterogeneity, and therefore no occasion for setting the special problem before us.

To this view no objection can be brought on the strength of the principle of the conservation of energy. This part of the doctrine of energy has undoubtedly reference to phenomena or sense data in a percipient's space form. It means that a given sequence of phenomena can in certain conditions be reversed. This doctrine is not affected if we decide that the causes of phenomena are conscious. The order of the universe is not less binding for any being because that being is conscious.

The problem has been stated above as it would present itself to a man who should study the mind and brain of another. The statement has thus been rendered more simple. Nothing of serious moment would need to be added should we consider the case of a man who studies the relation of his own mind and brain. He is never directly conscious of his brain. Into his most active consciousness there do not necessarily intrude any images of nerve cells. But it may be claimed that a man might conceivably see and touch his brain. He might; but only when he is related to his brain as an external percipient. The brain would be the brain of his sensations after the influence from it, or from his conscious states, had been propagated through various media. He would thus be an external spectator of himself. The character of the problem, therefore, is unaffected by the conceivable case of a man's perception of his own brain.

The merits and defects of the different theories of the relations between mind and brain can now be pointed out. Parallelism errs in treating the brain, in so far as it consists of the percipient's sensations, as an objective entity. It is right, indeed, when it has this brain in view, in maintaining that there are two series of facts. It is right, so far, even in its denial that the series affect each other; for the series called the mind and the series of the percipient's sensations called the brain, are not continuous and cannot in any way intermingle. But it is wrong in denying that there is any causal connection between the series called mind and the series of sensations in the percipient. The evidence points to the conclusion that they are parallel in the sense in which a series of events is parallel to a series of effects due to these events. Parallelism is wrong also in denying that the two series of entities independent of the spectator, the so-called mind on the one hand, and substance and energy on the other, are able to act on each other. For, so far as the showing of science goes, these two series are homogeneous.

The theory of interaction errs, even as parallelism does, in taking the brain of the percipient's sensations as an independent thing in itself on which the mind acts. It is right in affirming that the mind acts on the metaphysical entities, substance and energy. But when it gives as its reason for this affirmation, that energy, though a sphere by itself, may yet be accessible to influences from the outside, its contention cannot be sustained. For if matter and mind are heterogeneous, as the usual way of stating the theory of interaction seems to imply, the theory fails to be plausible, in spite of all that Professor Thilly and others have to urge in its favor. When the homogeneity of matter and mind is admitted, there is no difficulty in conceiving interaction; the causal connection is in this case on a footing similar to that on which it rests in all other cases.

There is another theory, not referred to by Professor Thilly, at which it is desirable for various reasons to glance. This is the theory that matter and mind are two aspects of one reality. We can now see that, so far as matter consists in the sensations of a percipient mind, it is not to be described as an aspect of the mind observed. If it be said, on the other hand, that the objective entities, mind and energy, are two aspects of one reality, we are presented with an hypothesis that seems to be self-contradictory. The term 'aspect' suggests the view of a percipient mind. In this case, two such aspects are not parts or forms of the reality, but belong to two distinct perceptions. If this interpretation of the term aspect be rejected, and it be claimed that by double aspect two forms of reality, intimately connected, are indicated, it is obvious that the theory has simply resolved itself into the theory of parallelism.

The explanation of the whole matter to which all these considerations seem to point, is that there are manifold series of states of consciousness which we may call minds; that matter is a reality akin to mind, though possibly removed from the mind of the animal by an interval greater than that which separates an amœba from a Shakespeare; that these minds are capable of producing changes in each other; that these changes represent the condition of the mind affected rather than the object occasioning the change; and that thus on the one hand, the brain of ordinary knowledge exists only in the percipient mind, and that on the other hand, between those various minds, including that indicated by energy, interaction is as natural as in any case of causality.

A number of possible objections may be considered. It may be said, energy must be different in nature from mind; for it is spatial and is governed by mechanical laws, whereas to apply such principles to mind must appear absurd. Such a view is often expressed in one form or another. But it is surely due to a lack of philosophical criticism. After all, to what do the principles of mechanics apply? To the sensations of the percipient. The matter which is described as moved about, consists of these sensations, and the space in which it is found is the space of the percipient's mind. But is not energy, it may be asked, independent of these sensations? Just so far as it is the laws of mechanics have no application to it that science can justify. They apply to what appears in space; and the space of these mechanical principles is the human percipient's form of thought. By their very nature, therefore, these principles apply to thought, and to thought only, and if we could succeed in justifying their application to a metaphysical entity such as the hypothetical energy, we should be far from showing that energy and mind are distinct; we should show, instead, that they are identical in nature.

Another objection may be made. It may be said by the idealist that we are not entitled to speak of matter and energy as objective, for they are only the thoughts of a thinker. It would take too long to attempt here a detailed examination of the contentions of subjective idealism. It does not concern us in any case to prove that there is a matter which is not mind. But when idealism asserts that the material world exists only in the states of a percipient mind, it looks as though it were guilty of sheer egotism. It is surely more reasonable to suppose that, as we believe in the existence of other persons through the sensations awakened in us, though we see not their souls, so we should believe in the objective reality of those existences we call material, though that objective reality is not known to us directly. Our concepts of substance and energy are as metaphysical speculations utterly crude forms of animism; but though they are crude, the principle of animism may be justifiable. We have not decided whether or not science means to use these conceptions metaphysically; but that the matter of the senses indicates a metaphysical realm, whether science is concerned with it or not, there is no satisfactory reason for doubting. It is reasonable to suppose that these objective realities represent many forms of mind, that the spirit manifest in human minds is not limited to human forms; and inasmuch as we can trace mind in forms lower than the human, forms which, only in the dimmest way, we can understand, we should not deem it strange if beyond or beneath these forms there are others, whose intimate nature is a mystery of darkness that is unillumined for us now, and may ever remain unillumined.

A third possible objection demands attention. It may be said that the material medium interposed between conscious spirits is something whose nature is altogether unlike that of thought, being not only unknown but also unknowable. This is not the matter of unreflecting common-sense. Nor is it the matter that science describes, for that matter is knowable. It might therefore be left out of account as not being the matter which the physiologist has in view, and which sets the special problem before us. Yet it is well to consider this hypothesis, for it is important to note that, if the objective existence of matter is conceded, this is the alternative to the hypothesis that matter is of the nature of thought. If matter is knowable, it is of the nature of mind, for like is known by like. If matter is utterly unlike mind, it is unknowable. Moreover, only when this theory is accepted can the problem of interaction present itself. For the problem would not arise with relative heterogeneity of substance. We do not make any special problem of the interaction of relatively heterogeneous forms of matter. It is only where there is absolute heterogeneity of two entities that the problem can perplex.

This hypothetical matter is unthinkable. It cannot be in space or in time, for space and time are thoughts. To it the term action, in any sense we can give it, may not be applied. Even existence can be predicated of it only in a remotely symbolic way. It is, indeed, doubtful if this theory can be presented without contradiction.

Further, this matter, though absolutely different from mind, is yet in intimate connection with mind, and determines to a large extent, if not entirely, the order of the conscious life. The hypothesis is offered as one of sheer dualism, but when the relations of the two entities are stated, the dualism seems to be abandoned. The inconsistency of maintaining an absolute dualism and asserting the correlation of the two entities is equally glaring whether the theory of parallelism or that of interaction is adopted.

Nor would the inconsistency be less were it said that mind is an effect or manifestation of this unthinking entity. It cannot be an effect, for causality is a thought relation, and we cannot speak of this unthinking entity as a cause. And, even if we could, such a generation of mind by an unthinking entity would fail to present any analogy to the other cases of causality found in experience, all of which point to homogeneity of cause and effect. Even when Professor Thilly contends that a mental cause may have a physical effect, it seems as if the argument gained what plausibility it had from treating energy as an intelligible part of an intelligible universe, of which universe conscious states are another part. But by the hypothesis we are considering, matter is utterly heterogeneous to mind. Mind, therefore, cannot be produced by matter; nor, again, can mind be a manifestation of this entity, for the two are supposed to have nothing in common.

Nor may appeal be made to the divine power and wisdom as explaining the correlation. This appeal would imply that matter is known and controlled by spirit, and, according to the hypothesis, this knowledge and intelligent control are impossible.

Let it be repeated, if matter exists objectively, this dualistic theory, contrasting mind with an absolutely heterogeneous entity is the alternative to the theory that matter is intelligible, and, therefore, in some sense, intelligent. There is no other theory possible.

It was suggested at the outset that what is indispensable to the solution of this problem is the application of the principle of philosophical criticism. The study of the subject has lent confirmation to this view. It is important to notice that this problem had its rise in precritical times. It need not, indeed, concern us at present to determine whether or not Descartes started the work of criticism; it is enough to note that he did not properly criticise the concept of material existence. He could distinguish clearly between the mind and the body, and he concluded that they were separate existences. He did not observe that he was thinking the two, that they were intelligible, and that therefore there was continuity between them. His followers likewise failed to see that both realities were intelligible or knowable, and attended only to their differences. Hence they declared it impossible for one of the forms of reality to act upon the other. It was no theory of an unknowable matter which led them to this position; it was the failure to analyze or criticise the concepts they employed. The hard antithesis of mind and brain is dissolved by criticism; and the problem of interaction disappears. It is, indeed, possible, as we have seen, to claim that matter is an unknowable entity; but, not to refer again to the inconsistency of this theory, it is evident that this is not the matter of Geulincx or Spinoza or Professor Thilly. The problem as presented by the Cartesians and by Professor Thilly is antiquated.

Let it be added that criticism has been applied in the present instance only so far as the purpose in hand seemed to require. What causality means, what is given in the fact of the action of one mind on another, are problems of great importance which demand the most thorough application of criticism. But it has concerned us here to deal only with the assumed heterogeneity of mind and brain.

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